



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,753	12/04/2003	Roman A. Genov		2833
Roman Genov 30 Helena Ave. Toronto, ON M6G 2H2 CANADA			EXAMINER MAL TAN V	
			ART UNIT 2193	PAPER NUMBER
			MAIL DATE 03/21/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/726,753

**Applicant(s)**

GENOV ET AL.

**Examiner**

Tan V. Mai

**Art Unit**

2193

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/C)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_
- 7) ☐ Paper No(s)/Mail Date \_\_\_\_\_

Art Unit: 2193

1. Applicant's election with traverse of Group II, claims 9-13, in Paper dated 3/15/07 is acknowledged. The traversal is on the ground(s) that :

"I. Based on 37 CFR I.I 43 I hereby request a reconsideration of the restriction requirement based on the following grounds:

a. The method claimed in claims 9-13 relies upon specific details of the apparatus claimed in claims 1-8 which are essential to the method.

The specific details claimed in the independent claim 1 are as follows:

"the apparatus comprising an array of charge-based cells receiving binary inputs, storing binary matrix elements and returning analog outputs; each cell comprising:

A first device storing charge representing one said binary matrix element, the stored charge coupling capacitively to an output line;

A second device coupled to said first device, where transfer of said charge between said first and second device in a computation cycle is controlled by an input line;

A third device coupled to said first device and to a data line, where write or refresh of said charge is activated onto said data line through a select line."

These same details are given in the independent claim 9 as follows:

"parallel signed binary-binary matrix-vector multiplier; said matrix-vector multiplier receiving signed binary inputs, storing signed binary matrix elements and returning analog outputs." The method claimed in claims 9-13 is only physically meaningful and thus patentable if all of the details listed in claim 1 are present (i.g., three charge-mode devices with input and output lines connection as stated).

b. Further more, claims 9-13 do not provide for any function other than multiplication with improved precision and should therefore be classified identically to claims 1-8 under class 708, subclass 7" (emphasis added).

This is not found persuasive because:

Group I, claims 1-8, is directed to an apparatus ... comprising an array of charge-based cells ...; however, Group II, claims 9-13, is directed to method for ... without the detail physical structure of claims 1-8. Therefore, the search for each Group are different. For example, the terms search [in data base] for Group II includes: matrix-vector multiplication / multiplier / multiply\$, signed adj bit / binary, pseudo random ....

The requirement is still deemed proper and is therefore made FINAL.

2. The abstract of the disclosure is objected to because legal phraseology is used in this paragraph (i.e., "comprises"). The abstract should be limited to to a single

Art Unit: 2193

paragraph within the range of 50 to 150 words. Also, the Abstract contains the undefined acronym "VLSI". All such acronyms should be defined at the instance of their first use within the Abstract. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities: page 5, the numbers "14...22" should be deleted.

Appropriate correction is required.

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 9-13 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method for large-scale high-resolution digital matrix-vector multiplication ...,does not reasonably provide enablement for a method for large-scale high-resolution digital matrix-vector multiplication having: (1) "produce pseudo-random inputs" and (2) "demodulation of said pseudo-random digital outputs to undo the effect of said modulation of said digital inputs". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to made and use the invention commensurate in scope with these claims.

The applicants have failed to disclose the physical structure for implementing their method with any meaningful degree of specificity.

The examiner contends that not only would it require undue experimentation to design the above method which would perform the function(s) disclosed and claimed, but that it would also require undue experimentation for one of ordinary skill in the art to design working method as claimed.

5. Claims 9-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim language is vague and indefinite. For instance, the phrase "modulation of digital to produce pseudo-random inputs" [of claim 9] seems to be misdescriptive. Does it mean a DAC for converting digital to analog input? It is noted that the specification does not disclose a random number generator for providing pseudo-random numbers / values. The phrase "signed ...multiplier" is not clear. Does it mean a "matrix-vector multiplier" step for multiplying the outputs of DAC? What does "quantization" mean? Is it a ADC? What are "produce pseudo-random digital outputs"? What does "demodulation ...undo ..." mean?

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 9-13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims recite a method for performing a mathematical function.

"[t]o satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:

- . The claimed invention "transforms" an article or physical object to a different state or thing.
- . The claimed invention otherwise produces a useful, concrete and tangible result,...".

See "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" OG Date: 22 November 2005.

In order for claims to be statutory, claims must include a practical application with a concrete, useful, and tangible result. However, claims 9-13 merely disclose steps of performing mathematical function without disclosing a **practical application with a concrete, useful, and tangible result, as they are pre-emptive in any application**. More specifically, the result is not tangible result because it is not a real world result. Therefore, claims 9-13 are directed to non-statutory subject matter.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cited references are art of interest.

8. An "art" rejection is held in abeyance until claims are submitted that comply with 35 USC 112.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tan V. Mai whose telephone number is (571) 272-3726. The examiner can normally be reached on Mon-Wed from 9:30am to 2:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

Art Unit: 2193

supervisor, Lewis Bullock, can be reached on (571) 272-3759. The fax phone number for the organization where this application or proceeding is assigned is:

Official (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2100.

/Tan V Mai/  
Primary Examiner, Art Unit 2193